Editorials

Endoscopic saphenous vein harvesting: The good, the bad, and the ugly

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In this issue of the *Journal*, Yun and colleagues[1] from Kaiser Permanente Medical Center in Los Angeles and Providence Health System present us with an excellent prospective randomized study comparing the midterm angiographic patency results between open saphenous vein harvesting and endoscopic vein harvesting (EVH). The study design is superb, the statistical analyses are impeccable, and the discussion is insightful and erudite. However, the clinical outcomes presented therein should have us all turning our heads and thinking further about how we do *that thing we do* on an almost daily basis: namely, coronary artery bypass surgery.

But which way should our heads be turning? As with many great articles, this one answers several important questions with regard to the efficacy and safety of EVH, but for me (and I suspect for many others out there), it raises a plethora of philosophical questions about the nature of *that thing we do* that have been left unanswered. Thus in my view these results, the questions they answer, and the contemplative ones they concomitantly raise can be summarized (with all due respect to Clint Eastwood, Lee Van Cleef, and Eli Wallach) as "The Good, The Bad, and The Ugly," with a new character thrown into the mix: "The Excellent."

The Good

EVH techniques are just as good as open harvesting techniques in terms of bypass graft patency. When evaluated by means of angiography at 6-month follow-up, there were no differences between the 2 techniques in overall patency, nor were there differences in the incidence of stenoses of patent vein grafts. Thus one can conclude that the use of EVH does not compromise midterm (6-month) vein graft patency.

EVH is good for the patient. The Yun study shows that EVH independently reduces leg wound complications by 67% compared with the open harvesting techniques. Furthermore, the leg wound complications that occurred were relatively minor compared with those that occurred with the open technique. In this respect EVH is absolutely, positively better than open harvesting. These are not new findings, but they nicely corroborate those already published and referenced by the authors.

EVH is good for diabetic patients. According to The Society for Thoracic Surgeons (STS) database, diabetic patients make up 29% of the coronary artery bypass grafting (CABG) population in this country, and the incidence is steadily increasing. In the Yun study diabetes was "surprisingly" found not to predispose to leg wound complications. This is not surprising in the least because all patients in this study were maintained on an insulin infusion protocol that strictly controlled blood glucose at less than 150 mg/dL. This is well below the 180 mg/dL (10 mmol) threshold of nonenzymatic glycation, which is the primary cause of impaired

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Received for publication Nov 22, 2004; accepted for publication Nov 30, 2004.

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J Thorac Cardiovasc Surg 2005;129:488-90

0022-5223/$30.00

doi:10.1016/j.jtcvs.2004.11.030

immunity in these patients. Thus these data show that strict glucose control is also good for all patients. What else would you expect *me* to say?

In our practice in Portland, 98% of saphenous vein grafts are harvested by means of EVH techniques. In the past, when patients used to come into our office for follow-up after CABG with open harvesting, they invariably had justifiable complaints about their leg incisions, such as persistent pain, poor healing, tightness, weeping, and ugly scars. One could hardly get them to talk about anything else. Now, with the ubiquitous use of EVH in our practice, they have to be directly queried about potential problems at their harvest site: "How's your leg doing?" "Why? What's wrong with my leg?!" routinely comes the response.

The Excellent

On the basis of the article by Yun and colleagues and others referenced therein, it should be obvious to the astute reader that EVH is a significant advance in the application of *that thing we do* because it diminishes the negative effect of traditional venous CABG without altering the midterm efficacy of the operation. How and why has this tremendous advance come about some 30 years after the inception of the operation itself? Was it enabled by a deluge of venture capital money looking for a place to proliferate, like leavened bread under a warm towel? Maybe. Were we shamed into it by the general and obstetric surgeons who were already minimizing the approaches to the things they do on a daily basis? Probably not: we're cardiothoracic surgeons, for God's sake! Was this an intuitive advance that we as cardiothoracic surgeons had to have? Never.

Rather, I submit to you that this incredible advance has come about and been successfully proliferated throughout our profession solely because of the dedication and perseverance of our right-hand men and women, our comrades-at-arms: the cardiovascular physician's assistants (CVPAs). These men and women are the excellent part of this story. They alone have brought about this advance in the safe application of our craft and have allowed us to claim another small victory in *that thing we do*. Yes, there have been surgeons involved along the way—Fogarty, Moon, Perrault, Puskas—but these are a few who have championed the cause to the masses of surgeons; there are fewer still who have taken the time to perform EVH themselves on a routine basis. And, yes, it often required some prodding and patience on our part, but for the most part, the widespread application of EVH came about because of the excellence of determination and steadfast will of the CVPAs. They have allowed us to take *that thing we do* to new places for we would not have had the time or the perseverance to go there ourselves. While we were concentrating on the sexy subjects of off-pump coronary artery bypass, arterial grafting, robotics, atrial fibrillation ablation surgery, left ventricular assist devices, artificial hearts, and the like, these excellent young men and women took our gold standard operation and kicked it up a notch.

To all of our excellent CVPAs, from all of us surgeons and especially from all of our patients, a warm, heart-felt, and well-deserved thank you is in order. You make *that thing we do* easier for us, better for the health care system, and safer for our patients.

The Bad

Having said all that, I was saddened not to see a single CVPA name in the authorship list or even acknowledged in the Yun article. All too often the real heroes in a story are overlooked as technology rapidly advances and victory is declared by industry leaders and the captains of our various ships. To me, these are bad precedents that must change to continue to stimulate teamwork and growth in our profession and attract, retain, and encourage excellence in our CVPAs.

But "The Bad" comes in other flavors from this article as well. Although the occlusion and restenosis rates are equivalent, they are anything but good. At 6 months there is a 20% overall occlusion rate and a 31.5% rate of occlusion or restenosis of greater than 50%.

"You have got to be kidding me," I thought. "This is definitely bad. But wait, our results couldn't be as bad as these. Those men and women must not be 'as good' as me and my partners. We have great results here."

Unfortunately, none of us really know what our individual patency and restenosis rates are for venous CABG. Most, if not all of us, believe we are great technical surgeons: it has to be so for us to emotionally survive in this highly demanding profession. We believe our bypasses last longer than those of others who have time to publish their results; we believe we can graft 1-mm coronary vessels perfectly and that they will last for years to come. Reality dictates otherwise.

This cardiovascular surgical "ostrich phenomenon" is another interesting component of this story. It does not always happen—in fact, I think it is becoming more rare—but when it does, it is really bad for the surgeon and his or her patients. Fortunately, through weeks, months, and years of surgical morbidity and mortality conferences, most surgeons come to realize we cannot improve on our failures unless we first accept our own shortcomings and then seek solutions.

This is where the current article lets its inquisitive readers down because it offers us few, if any, clinically relevant clinical clues as to how we could improve on these perceptively poor results. The only independent predictors of vein graft patency were congestive heart failure, ultrasonically measured vein graft flow, and grafting to the diagonal

territory, none of which are modifiable at the time of the operation. We certainly are not going to skip a graft to a diagonal artery because it might go down, nor are we going to ignore needed grafts in patients with congestive failure; few, if any, would redo a graft with slightly lower flows after completion.

However, some suggestive clues do exist. When flow was removed from the equation, the authors found that the severity of distal coronary disease became a significant predictor of occlusion. In addition, diagonal grafting and decreased flow might be surrogate variables for smaller target vessels and poor coronary runoff. Larger vein grafts also appear to be bad in terms of patency. Unfortunately, the authors give us no information on specific target and graft size and quality with which we could modify the daily practice of *that thing we do*. How large is too large? How small is too small? Should we be using calf veins? What about the lay of the graft at completion? This was not assessed as a variable in this study. A more accurate assessment of the quality of the vein graft—thick or thin walled, multiple branches, size changes, varicosities, and such—would have been clinically helpful. Thus it would have also been helpful and highly important to see univariate analyses of coronary size, vein graft size, and quality with respect to patency.

The Ugly

The importance of these unpublished relationships becomes evident when we examine the potential market effect of "The Ugly"; that is, the potential market effect of these data in the hands of the enterprising, entrepreneurial, well-funded percutaneous interventional drug-eluting stent (DES) marketeers. DESs have an established 6-month restenosis rate of 6% to 9%. Obviously, even using old math, this appears to be way better than the 31% reported herein. On the surface, an easy argument could be made to the lay public that DESs are better than CABG vein grafts, and I am sure that will occur if it has not already. What must be pointed out is that a graft to a 1.25-mm artery distal in a diseased coronary tree could not and should not be expected to have the same patency outcomes as a DES to a 3-mm proximal arterial stent. Furthermore, because more and more DESs are being placed in patients with large multivessel disease, we as surgeons see proportionally more small and diffusely diseased vessels, which we are asked to graft. Thus our success rates in terms of patency will, by necessity, go down.

So what is a surgeon to do? The answer should be intuitive; in fact, it must be intuitive because it cannot be explicitly derived from these data. It is anything and everything possible to help the patient. What is *most* important to the patient? Is it graft patency? No. Is it an incision on their chest versus a stick in the groin? To some, maybe. These are the obtuse marketing angles that will be used by the percutaneous marketeers to advance their trade and raise the value of their stock: laudable goals in the business world.

But what is truly of ultimate importance in the real world of the patient is survival, most specifically *long-term survival*. This has been the goal of cardiac surgery since its inception. It is the basic tenet of our profession and the goal on which we as surgeons should refocus and of which patients should be made aware. Coronary bypass grafting produces better 5-year survival rates than multivessel stenting, multiple arterial grafting improves survival compared with multivein grafting, complete revascularization improves survival compared with incomplete revascularization, glucose control improves survival in diabetic patients, and there are more.

We, as individual surgeons, can and must do our part by making patients and primary care physicians aware of the survival data, increasing our use of multiple arterial grafting, completely revascularizing all our patients whenever possible, using transmyocaridal revascularization to improve the completeness of revascularization in patients with suboptimal targets or grafts, incorporating insulin infusion protocols, and, yes, using endoscopically harvested vein grafts when veins must be used. If we embrace internal changes that focus on and enhance our basic goal, external changes that are not focused on this ultimate goal have no chance of making *that thing we do* obsolete.

Reference

1. Yun KL, Wu Y, Aharonian V, Mansukhani P, Pfeffer TA, Sintek CF, et al. Randomized trial of endoscopic versus open vein harvest for coronary artery bypass grafting: six-month patency rates. *J Thorac Cardiovasc Surg*. 2005;129:496-503.